

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 September 2001 (13.09.2001)

PCT

(10) International Publication Number
WO 01/66905 A3

(51) International Patent Classification: **E21B 19/16**,
3/04, 19/20, 19/15, 19/10, 21/00, 21/10

[US/GB]: The Tower, Melville Court, 75 Rose Street, Aberdeen AB10 1UH (GB).

(21) International Application Number: PCT/GB01/00781

(74) Agent: **MURGITROYD & COMPANY**; 373 Scotland Street, Glasgow G5 8QA (GB).

(22) International Filing Date: 26 February 2001 (26.02.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0004354.7 25 February 2000 (25.02.2000) GB

(81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(71) Applicant (*for all designated States except US*): **WEATHERFORD/LAMB, Inc** [US/US]; 515 Post Oak Blvd., Suite 600, Houston TX 77207 (US).

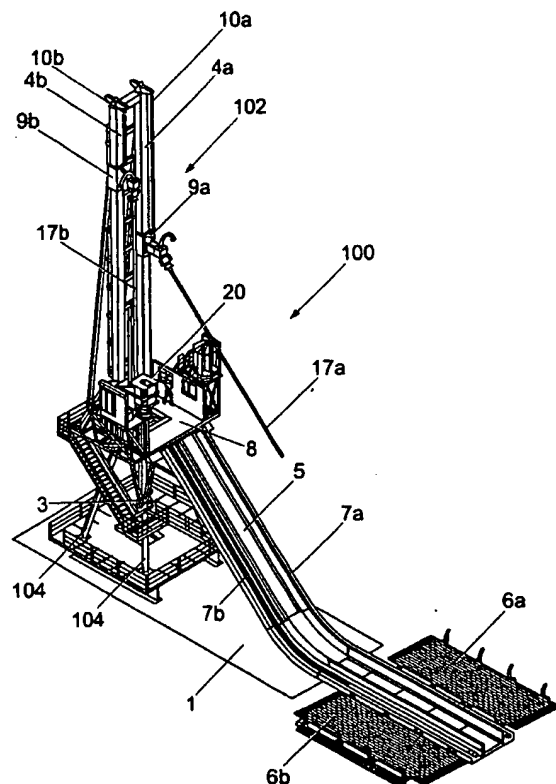
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **ROBICHAUX, Dicky**

[Continued on next page]

(54) Title: APPARATUS AND METHOD RELATING TO TONGS, CONTINUOUS CIRCULATION AND TO SAFETY SLIPS



(57) Abstract: Apparatus for inserting or removing a string of tubular from a borehole includes upper and lower closed head power tongs to make up/break out connections with the lower tong as rotary back-up. It also includes a continuous circulation system to keep fluid circulating during tripping operations and a safety slip to prevent tubulars slipping therein comprising two arrangements of grips which are coupled to one another.

WO 01/66905 A3



Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:
7 February 2002

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/00781

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E21B19/16 E21B3/04 E21B19/20 E21B19/15 E21B19/10
E21B21/00 E21B21/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E21B F16K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 34089 A (BAKKER THOMAS WALBURGIS ;WELL ENGINEERING PARTNERS B V (NL); WECHE) 8 July 1999 (1999-07-08) page 3, line 3 -page 4, line 5; figures 1,6 page 5, line 20 -page 8, line 2 ---	1-3,5-8
X	US 1 386 908 A (HENRY TAYLOR WILLIAM) 9 August 1921 (1921-08-09) page 1, line 108 -page 2, line 19; figure 2 ---	1-3,7,8
A	US 4 938 109 A (TORRES CARLOS A ET AL) 3 July 1990 (1990-07-03) column 6, line 40 - line 45; figure 2 --- -/--	1



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

18 September 2001

Date of mailing of the international search report

27.09.2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Dantinne, P

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 01/00781

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	WO 01 03889 A (BANGERT DANIEL S) 18 January 2001 (2001-01-18) page 5, line 13 - line 25; figure 1 ---	1
A	US 4 246 809 A (KEAST LARRY G ET AL) 27 January 1981 (1981-01-27) column 2, line 23 - line 39; figure 1 column 8, line 65 - line 66 ---	1
A	US 5 746 276 A (STUART RANDOLPH L) 5 May 1998 (1998-05-05) column 2, line 8 - line 34; figure 1 column 5, line 26 - line 28 ---	1
A	US 4 450 906 A (FIRMIN DANIEL) 29 May 1984 (1984-05-29) column 7, line 56 - line 60; figure 1 ---	1
X	WO 98 16716 A (AYLING JOHN LAURENCE) 23 April 1998 (1998-04-23) page 7, line 10 - line 17; figures 1,7 page 11, line 17 - line 24; claims 9,10 ---	9-24
X	US 3 559 739 A (HUTCHISON STANLEY O) 2 February 1971 (1971-02-02) Abstract claim 5; figure 1 ---	9-24
P,X	WO 00 23686 A (BAKKER THOMAS WALBURGIS ;WELL ENGINEERING PARTNERS B V (NL); KOCH) 27 April 2000 (2000-04-27) Abstract claim 1; figure 1 ---	9-24
P,X	WO 00 79092 A (SHELL CANADA LTD ;SHELL INT RESEARCH (NL)) 28 December 2000 (2000-12-28) page 3, line 21 -page 5, line 33; figure 1 ---	9-24
P,X	WO 00 22278 A (MARIS INT LTD ;AYLING LAURENCE JOHN (GB)) 20 April 2000 (2000-04-20) claim 1; figure 1 ---	9-24
A	US 4 159 637 A (LAMB RAYMOND K ET AL) 3 July 1979 (1979-07-03) column 5, line 16 - line 27; figure 1 ---	23,24
X	US 5 706 893 A (MORGAN MICHAEL GRAHAM) 13 January 1998 (1998-01-13) column 2, line 61 -column 3, line 21; figure 3 column 4, line 18 - line 22 ---	25-29

-/--

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/00781

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 499 919 A (FORESTER BUFORD G) 19 February 1985 (1985-02-19) column 1, line 35 - line 41; figures 1,2 column 2, line 4 - line 26; claim 1 ---	25-29
X	US 2 214 194 A (FRANKLEY LAWRENCE W) 10 September 1940 (1940-09-10) page 1, column 1, line 1 - line 17; figures 1,2 page 2, column 1, line 1 - line 48 ---	25-29
X	GB 2 300 896 A (HOPKINSONS LTD) 20 November 1996 (1996-11-20) claim 1; figures 1,2 ---	25-29
X	US 5 992 801 A (TORRES CARLOS A) 30 November 1999 (1999-11-30) Abstract figure 2 ---	30-37
X	US 3 349 455 A (J.R. DOHERTY) 31 October 1967 (1967-10-31) column 1, line 29 - column 2, line 4; claim 1; figures 3,6 column 3, line 32 - line 35 column 4, line 18 - line 20 ---	30-32, 34,35,37
X	US 3 443 291 A (DOHERTY JACK R) 13 May 1969 (1969-05-13) column 3, line 65 - line 75; claim 1; figures 5,7 ---	30,31, 34,35,37
A	US 4 715 625 A (SHOWS JR JESS W ET AL) 29 December 1987 (1987-12-29) column 1, line 61 - line 67; figure 2 column 2, line 12 - line 25 -----	30

INTERNATIONAL SEARCH REPORT

I. International application No.
PCT/GB 01/00781

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-8

A tong apparatus comprising upper and lower tong to make up/break out a tubular connection

2. Claims: 9-22

Apparatus and method to circulate fluid through a tubular string

3. Claims: 23-24

Upper and lower seal device to provide a seal with a tubular to be made up in to or broken out from a tubular string

4. Claims: 25-29

A valve mechanism to seal between two tubulars

5. Claims: 30-37

Apparatus to prevent one tubular slipping therein

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/00781

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9934089	A	08-07-1999	WO 9934089 A1 AU 5349798 A BR 9714942 A EP 1042581 A1 PL 341422 A1	08-07-1999 19-07-1999 10-10-2000 11-10-2000 09-04-2001
US 1386908	A	09-08-1921	NONE	
US 4938109	A	03-07-1990	CA 1319543 A1	29-06-1993
WO 0103889	A	18-01-2001	US 6223629 B1 WO 0103889 A1	01-05-2001 18-01-2001
US 4246809	A	27-01-1981	NONE	
US 5746276	A	05-05-1998	US 5566769 A	22-10-1996
US 4450906	A	29-05-1984	NONE	
WO 9816716	A	23-04-1998	AU 732227 B2 AU 4632697 A BR 9712521 A EP 0932745 A1 WO 9816716 A1 NO 991515 A	12-04-2001 11-05-1998 19-10-1999 04-08-1999 23-04-1998 04-06-1999
US 3559739	A	02-02-1971	CA 935149 A1 DE 2030169 A1 DK 131739 B FR 2046938 A1 GB 1312841 A NL 7009046 A ,B NO 130736 B	09-10-1973 07-01-1971 25-08-1975 12-03-1971 11-04-1973 22-12-1970 21-10-1974
WO 0023686	A	27-04-2000	WO 0023686 A1 AU 9765698 A EP 1125036 A1 NO 20011941 A	27-04-2000 08-05-2000 22-08-2001 19-06-2001
WO 0079092	A	28-12-2000	AU 5816800 A WO 0079092 A2	09-01-2001 28-12-2000
WO 0022278	A	20-04-2000	AU 6220799 A BR 9914774 A EP 1121508 A1 WO 0022278 A1 NO 20011680 A	01-05-2000 03-07-2001 08-08-2001 20-04-2000 06-06-2001
US 4159637	A	03-07-1979	AU 4205578 A CA 1092968 A1 DE 2852455 A1 FR 2412837 A1 GB 2010359 A ,B IT 1101184 B NL 7811852 A NO 784072 A	14-06-1979 06-01-1981 07-06-1979 20-07-1979 27-06-1979 28-09-1985 07-06-1979 06-06-1979
US 5706893	A	13-01-1998	GB 2287263 A	13-09-1995

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/00781

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5706893	A	BR 9500816 A FR 2716949 A1 NO 950818 A	24-10-1995 08-09-1995 05-09-1995
US 4499919	A	19-02-1985 US 4304261 A	08-12-1981
US 2214194	A	10-09-1940 NONE	
GB 2300896	A	20-11-1996 NONE	
US 5992801	A	30-11-1999 NONE	
US 3349455	A	31-10-1967 NONE	
US 3443291	A	13-05-1969 NONE	
US 4715625	A	29-12-1987 NONE	

THIS PAGE BLANK (USPTO)
